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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,311	11/21/2005	Sankar Narayan Jagannathan	1890-0188	6425

7590 02/01/2008

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EXAMINER	
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ART UNIT	PAPER NUMBER
2146	

MAIL DATE	DELIVERY MODE
02/01/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/524,311	Applicant(s) JAGANNATHAN ET AL.	
	Examiner Shaq Taha	Art Unit 2146	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/13/2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18 - 37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

This is a final action for application number 10/524,311 based on after non-final filed on 11/13/2007. The original application was filed on 11/21/2005. Claims 18 – 37 are currently pending and have been considered below. Claims 18, 30, and 36 are independent claims.

Applicant's Response

In the applicant's response dated 11/13/2007; the applicant argued against all the rejections set forth on the non-final rejection on 08/08/2007.

Response to Arguments

Rejection under 35 USC 112 (2ND Paragraph):

The rejection set forth for claims 32, and 37 under 35 USC – 112 (2nd Paragraph) because it is unclear what the applicant means by a limitation or for being indefinite, the rejection has been withdrawn because the applicant's clarification has been added to the claims.

Rejection under 35 USC 102(b) - (Claims 24, 30, and 36):

Regarding claim 24, 30, and 36 the applicant argues that Fenner et al. does not teach comparing the compressed destination address identifier with entries of a routing table, each entry corresponding to a forwarding address available for routing.

The examiner disagrees, Fenner et al. teaches a system for routing a message between a source and a destination and which utilizes a message format that is structure-independent of the location of the message destination.

Fenner et al. further teaches comparing the address identifier with entries from a routing table, wherein each entry is corresponding a forwarding address, As shown in fig. 12, wherein the loop 1203 compares the change in the symbol to the change in the table, And saves the changes corresponding to the changes.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

- Claims 18 - 20, 22 – 28, and 30 - 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Fenner et al. (5,842,224).

Regarding claim 18, Fenner teaches a method for routing of data packets, **[Routing is accomplished by maintaining a routing table directory 130 at each node in the network as is well-known in the art, (Column 17 lines 6 – 10)];**

comprising the steps: (a) extracting a destination address identifier from a data packet to be forwarded, **[The router strips off the incoming physical header 120 and the LLC header 122. It looks up the destination and source addresses 126 and 128 in its routing table 130, selects the appropriate outbound link, (Column 16, lines 23 – 26)];**

(b) compressing the destination address identifier using a compression algorithm, **[Arithmetic coding is a powerful technique for obtaining the near minimum entropy compression of a sequence of data bits. Since a network address is just a sequence of binary data bits of known length, the minimum entropy**

compression of all the combinations of bit strings represented by all of the active network addresses should produce the shortest number of bits which would uniquely identify all of the addresses, (Column 17, lines 42 – 49) and (Fig.4 Ref 130)];

(c) comparing the compressed destination address identifier with entries of a routing table, each entry corresponding to a forwarding address available for routing, **[As shown in fig. 12, wherein the loop 1203 compares the change in the symbol to the change in the table, And saves the changes corresponding to the changes];**

and (d) if a positive comparison between the compressed destination address identifier and an entry stored in the routing table is found in step, (c), then switching the data packet to an output link associated with the forwarding address corresponding to the entry **[The router strips off the incoming physical header 120 and the LLC header 122. It looks up the destination and source addresses 126 and 128 in its routing table 130, selects the appropriate outbound link, (Column 16, lines 23 – 26)].**

<u>Regarding claim 19</u>, Fenner teaches the method wherein each of the entries of the routing table comprises a forwarding address compressed using the compression algorithm, **[Arithmetic coding is a powerful technique for obtaining the near minimum entropy compression of a sequence of data bits. Since a network address is just a sequence of binary data bits of known length, the minimum entropy compression of all the combinations of bit strings represented by all of the active network addresses should produce the shortest number of bits which**

would uniquely identify all of the addresses, (Column 17, lines 42 – 49) and (Fig.4 Ref 130)].

Regarding claim 20, Fenner teaches the method wherein the compression algorithm comprises a lossless data compression algorithm, **[The novel system uses arithmetic coding of the directory index 130 as shown by the diagrammatic illustration in FIG. 4. Arithmetic coding is a powerful technique for obtaining the near minimum entropy compression of a sequence of data bits, (Column 17, lines 40 – 58)].**

Regarding claim 22, Fenner teaches the method further comprising adjusting at least one parameter of the data compression algorithm in dependence upon data characteristics of the destination address identifier, **[The novel system uses arithmetic coding of the directory index 130 as shown by the diagrammatic illustration in FIG. 4. Arithmetic coding is a powerful technique for obtaining the near minimum entropy compression of a sequence of data bits. Since a network address is just a sequence of binary data bits of known length, the minimum entropy compression of all the combinations of bit strings represented by all of the active network addresses should produce the shortest number of bits which would uniquely identify all of the addresses. This encoding could then be used as an index 136 into the routing directory 130. Essentially arithmetic coding uses the distribution statistics of the symbols (in this case octet values) to divide a unit space into a unique fraction based on the sequence of symbols (octets)**

presented. As each symbol (octet) is presented, the unit space is subdivided into a smaller range. Symbols (Octets) with higher probability of occurrence reduce the range less than those with small probability, causing fewer bits to be used in encoding the higher probability octets, (Column 17, lines 40 – 58)].

Regarding claim 23, Fenner teaches the method, step (c) further comprises comparing the compressed destination address identifier with entries of the routing table taking into account a similarity between the compressed destination address identifier and a compressed destination address identifier of a preceding data packet, **[Frequently, at least one, and sometimes all but one, of the symbols in the key has already been encoded. If a symbol (as defined by its value and position within the key) has been encoded, learned key logic performs no function, and the key index values are read into arithmetic computation logic circuitry 72', (Column 25, lines 25 – 30)].**

Regarding claim 24, Fenner teaches the method wherein step b) further comprises compressing the destination address identifier using a code table that associates a code word to a symbol of the destination address identifier and to a symbol of each forwarding address, respectively, **[Arithmetic coding, when applied to addresses as known length keys, provides several advantages for table look-up when the addresses are known or can be learned in advance as they are in**

communications applications, (Column 4, lines 62 – 65) & (Column 5, lines 5 – 10)].

Regarding claim 25, Fenner teaches the method wherein each symbol of the destination address identifier and each symbol of a forwarding address, respectively, comprises a plurality of bits of the destination address identifier and a plurality of bits of the forwarding address, respectively, **[Since a network address is just a sequence of binary data bits of known length, the minimum entropy compression of all the combinations of bit strings represented by all of the active network addresses should produce the shortest number of bits which would uniquely identify all of the addresses. This encoding could then be used as an index 136 into the routing directory 130. Essentially arithmetic coding uses the distribution statistics of the symbols (in this case octet values) to divide a unit space into a unique fraction based on the sequence of symbols (octets) presented, (Column 17, lines 44 – 54)].**

Regarding claim 26, Fenner teaches the method wherein each symbol of the destination address identifier and each symbol of the forwarding addresses comprises four successive bits of the destination address identifier and the forwarding address, respectively, **[Since a network address is just a sequence of binary data bits of known length, the minimum entropy compression of all the combinations of bit strings represented by all of the active network addresses should produce the shortest number of bits which would uniquely identify all of the addresses. This**

encoding could then be used as an index 136 into the routing directory 130. Essentially arithmetic coding uses the distribution statistics of the symbols (in this case octet values) to divide a unit space into a unique fraction based on the sequence of symbols (octets) presented, (Column 17, lines 44 – 54)].

Regarding claim 27, Fenner teaches the method wherein step b) further comprises compressing the destination address identifier using the code table that associates the code word to the symbol of the destination address identifier, the length of each code word being inversely related to an appearance probability of a corresponding symbol in the code table, **[As each symbol (octet) is presented, the unit space is subdivided into a smaller range. Symbols (Octets) with higher probability of occurrence reduce the range less than those with small probability, causing fewer bits to be used in encoding the higher probability octets, Arithmetic coding is a powerful technique for obtaining the near minimum entropy compression of a sequence of data bits. Since a network address is just a sequence of binary data bits of known length, the minimum entropy compression of all the combinations of bit strings represented by all of the active network addresses should produce the shortest number of bits which would uniquely identify all of the addresses, (Column 17, lines 42 – 58) and (Fig.4 Ref 130)].**

Regarding claim 28, Fenner teaches the method, wherein step b) further comprises compressing the destination address identifier using the code table that associates the

code word to the symbol of the destination address identifier, the length of each code word being inversely related to an appearance probability of a corresponding symbol in the destination address identifier of an input data packet, **[As each symbol (octet) is presented, the unit space is subdivided into a smaller range. Symbols (Octets) with higher probability of occurrence reduce the range less than those with small probability, causing fewer bits to be used in encoding the higher probability octets, (Column 17, lines 54 – 58)].**

Regarding claim 30, Fenner teaches a routing apparatus for routing of data packets, **[Routing is accomplished by maintaining a routing table directory 130 at each node in the network as is well-known in the art, (Column 17 lines 6 – 10)];**
comprising: a first data compressor configured to receive a destination address identifier of a data packet to be forwarded and generate a compressed destination address identifier therefrom, **[Arithmetic coding is a powerful technique for obtaining the near minimum entropy compression of a sequence of data bits. Since a network address is just a sequence of binary data bits of known length, the minimum entropy compression of all the combinations of bit strings represented by all of the active network addresses should produce the shortest number of bits which would uniquely identify all of the addresses, (Column 17, lines 42 – 49) and (Fig.4 Ref 130)];**
a routing table store configured to store a plurality of entries, each entry corresponding to a forwarding address available for routing, **[The associative memory includes an**

index table stored in memory and a record memory for storing the records of data, (Column 6, lines 44 – 47)];

a routing unit configured to compare the compressed destination address identifier with the entries stored in the routing table store for finding a correspondence between the compressed destination address identifier and one of the entries, each entry corresponding to a forwarding address, **[As shown in fig. 12, wherein the loop 1203 compares the change in the symbol to the change in the table, And saves the changes corresponding to the changes];**

and a switch configured to switch the data packet to an output link associated with a forwarding corresponding to a entry corresponding to the compressed destination address identifier, **[The router strips off the incoming physical header 120 and the LLC header 122. It looks up the destination and source addresses 126 and 128 in its routing table 130, selects the appropriate outbound link, (Column 16, lines 23 – 26)].**

<u>Regarding claim 31</u>, Fenner teaches the routing apparatus, further comprising a second data compressor configured to compress the forwarding addresses according to said data compression algorithm, and wherein the entries in the routing table store comprise compressed forwarding addresses, **[Arithmetic coding is a powerful technique for obtaining the near minimum entropy compression of a sequence of data bits. Since a network address is just a sequence of binary data bits of known length, the minimum entropy compression of all the combinations of bit strings**

represented by all of the active network addresses should produce the shortest number of bits which would uniquely identify all of the addresses, (Column 17, lines 42 – 49) and (Fig.4 Ref 130)].

Regarding claim 32, Fenner teaches the routing apparatus, wherein the first data compressor is configured to use a lossless data compression algorithm, **[The novel system uses arithmetic coding of the directory index 130 as shown by the diagrammatic illustration in FIG. 4. Arithmetic coding is a powerful technique for obtaining the near minimum entropy compression of a sequence of data bits, (Column 17, lines 40 – 58)].**

Regarding claim 33, Fenner teaches the routing apparatus, wherein the first data compressor is configured to use a data compression algorithm being selected from a group comprising Huffman algorithms, Arithmetic algorithms, and Lempel-Ziv algorithms. **[The novel system uses arithmetic coding of the directory index 130 as shown by the diagrammatic illustration in FIG. 4, (Column 17, lines 40 – 43)].**

Regarding claim 34, Fenner teaches The routing apparatus, further comprising a compression parameter adjuster configured to adjust at least one parameter of the first data compressor in dependence upon data characteristics of the destination address identifier, **[The novel system uses arithmetic coding of the directory index 130 as shown by the diagrammatic illustration in FIG. 4. Arithmetic coding is a powerful**

technique for obtaining the near minimum entropy compression of a sequence of data bits. Since a network address is just a sequence of binary data bits of known length, the minimum entropy compression of all the combinations of bit strings represented by all of the active network addresses should produce the shortest number of bits which would uniquely identify all of the addresses. This encoding could then be used as an index 136 into the routing directory 130. Essentially arithmetic coding uses the distribution statistics of the symbols (in this case octet values) to divide a unit space into a unique fraction based on the sequence of symbols (octets) presented. As each symbol (octet) is presented, the unit space is subdivided into a smaller range. Symbols (Octets) with higher probability of occurrence reduce the range less than those with small probability, causing fewer bits to be used in encoding the higher probability octets, (Column 17, lines 40 – 58)].

Regarding claim 35, Fenner teaches the routing apparatus, wherein the routing unit is operably connected to provide feedback information to the first data compressor, **[If, in the event of a transmission back along that path, it was found that the closest node was for some reason out of the system, it could then pick one of the other possible routes and send the information to a different node along one of those routes, (Column 9, lines 50 – 55)].**

Regarding claim 36, Fenner teaches a routing apparatus for routing of data packets, **[Routing is accomplished by maintaining a routing table directory 130 at each node in the network as is well-known in the art, (Column 17 lines 6 – 10)];**

comprising: extraction means for extracting a destination address identifier from a data packet to be forwarded, **[The router strips off the incoming physical header 120 and the LLC header 122. It looks up the destination and source addresses 126 and 128 in its routing table 130, selects the appropriate outbound link, (Column 16, lines 23 – 26)];**

routing table storing means for storing a plurality of entries, each entry corresponding to a forwarding address available for routing, **[The associative memory includes an index table stored in memory and a record memory for storing the records of data, (Column 6, lines 44 – 47)];**

a routing unit for comparing the destination address identifier with the entries stored in the routing table storing means for finding a correspondence between the destination address identifier and one of the forwarding addresses, **[[As shown in fig. 12, wherein the loop 1203 compares the change in the symbol to the change in the table, And saves the changes corresponding to the changes];**

and switch means for switching the data packet to an output link associated with the respective forwarding address matching the destination address identifier, **[The router strips off the incoming physical header 120 and the LLC header 122. It looks up the destination and source addresses 126 and 128 in its routing table 130, selects the appropriate outbound link, (Column 16, lines 23 – 26)];**

wherein first data compression means are provided for compressing the destination address identifier extracted by the extraction means according to a data compression algorithm, , **[Arithmetic coding is a powerful technique for obtaining the near minimum entropy compression of a sequence of data bits. Since a network address is just a sequence of binary data bits of known length, the minimum entropy compression of all the combinations of bit strings represented by all of the active network addresses should produce the shortest number of bits which would uniquely identify all of the addresses, (Column 17, lines 42 – 49) and (Fig.4 Ref 130)];**

and wherein second data compression means are provided for compressing the forwarding addresses according to said data compression algorithm and storing the compressed forwarding addresses in the routing table storing means, **[Arithmetic coding is a powerful technique for obtaining the near minimum entropy compression of a sequence of data bits. Since a network address is just a sequence of binary data bits of known length, the minimum entropy compression of all the combinations of bit strings represented by all of the active network addresses should produce the shortest number of bits which would uniquely identify all of the addresses, (Column 17, lines 42 – 49) and (Fig.4 Ref 130)];**

the routing unit being configured such that it compares the compressed destination address identifier with the compressed forwarding addresses stored in the routing table storing means, **[The router strips off the incoming physical header 120 and the LLC header 122. It looks up the destination and source addresses 126 and 128 in**

its routing table 130, selects the appropriate outbound link, (Column 16, lines 23 – 26)].

Regarding claim 37, Fenner teaches the routing apparatus, wherein the first and second data compression means are configured such that they use a lossless data compression algorithm which reduces redundancy in the destination address identifier and the forwarding addresses, respectively, without losing any information content, **[The novel system uses arithmetic coding of the directory index 130 as shown by the diagrammatic illustration in FIG. 4. Arithmetic coding is a powerful technique for obtaining the near minimum entropy compression of a sequence of data bits, (Column 17, lines 40 – 58)].**

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

- **Claim 21** is rejected under 35 U.S.C. 103(a) as being unpatentable over Fenner et al. (US 5,842,224) as applied to claims 1 above, and further in view of Okada et al. (US 6,026,198).

Regarding Claim 21, Fenner teaches the method according to claim 20, as described above. Fenner further teaches the method wherein the lossless data compression algorithm is selected from a group comprising, Arithmetic algorithms **[The novel system uses arithmetic coding of the directory index 130 as shown by the diagrammatic illustration in FIG. 4, (Column 17, lines 40 – 43)].**

Fenner et al. differs from the claimed invention is that Huffman algorithms and Lempel-Ziv algorithms is not taught in Fenner et al.

Okada teaches for handling data having a fixed-order context, a data compression system uses a pipeline control unit to enable an occurrence frequency modeling unit and entropy coding unit to operate in pipelining. A data restoration system uses a pipeline control unit to enable an entropy decoding unit and occurrence frequency modeling unit to operate in pipelining, **(See Abstract),** and further teaches Huffman

algorithms and Lempel-Ziv algorithm , **(Column 2, line 10) & (Column 1, line 47).** Okada provides the advantage of using Huffman algorithms and Lempel-Ziv algorithm. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Fenner by including an Huffman algorithms and Lempel-Ziv algorithm as taught by Okada.

One of ordinary skill in the art would have been motivated to make this modification in order provide the advantage of providing the advantage of using Huffman algorithms and Lempel-Ziv algorithm.

- **Claim 29** is rejected under 35 U.S.C. 103(a) as being unpatentable over Fenner et al. (US 5,842,224) as applied to claims 1 above, and further in view of Yamato et al. (US 6,094,431).

Regarding Claim 29, Fenner teaches the method according to claim 1, as described above. Fenner further provides for fast access times with very large key fields, an associative memory utilizes a location addressable memory and look up tables to generate from a key an address in memory storing an associated record. The look up tables, stored in a memory, are constructed with the aid of arithmetic data compression methods to create a near perfect hashing of the keys, **(See Abstract).**.

Fenner et al. differs from the claimed invention is that forwarding data packet from an IPv6 is not taught in Fenner et al.

Yamato teaches A network resource reservation scheme capable of making a resource reservation at the IP level according to the resource reservation protocol at a time of data packet transfer at the IP level using ATM networks, **(See Abstract),** and further teaches that for the identifier of the IP packet flow, when the packet is in a format according to the Internet Protocol Version 6 (IPv6), a set of a flow label value and a source address value given in the header portion of the packet is used, **(Column 24, lines 45 - 52).** Yamato provides the advantage of forwarding data packet from an IPv6. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Fenner by including an IPv6 to forward data packet as taught by Yamato.

One of ordinary skill in the art would have been motivated to make this modification in order provide the advantage of providing the advantage of using an IPv6 data packet.

Conclusion

The following prior art made of record and not relied upon is cited to establish the level of skill in the applicant's art and those arts considered reasonably pertinent to applicant's disclosure. See **PEP 707.05(c)**.

The following are analogous art because they are from the same field of endeavor of Method for Routing of Data Packet and Routing Apparatus:

- Fenner et al. (5,842,224).
- Okada et al. (US 6,026,198).
- Yamato et al. (US 6,094,431).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Shaq Taha** whose telephone number is 571-270-1921. The examiner can normally be reached on 8:30am-5pm Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Jeff Pwu** can be reached on 571-272-6798.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

01/06/07

S. Taha

JEFFREY PWU
SUPERVISORY PATENT EXAMINER